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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/549,837

06/29/2006

Tuan Quoc Ly

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06/05/2008

MARSHALL, GERSTEIN & BORUN LLP  
233 S. WACKER DRIVE, SUITE 6300  
SEARS TOWER  
CHICAGO, IL 60606

EXAMINER

MABRY, JOHN

ART UNIT

PAPER NUMBER

1625

MAIL DATE

DELIVERY MODE

06/05/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/549,837	<b>Applicant(s)</b> LY, TUAN QUOC	
	<b>Examiner</b> John Mabry, PhD	<b>Art Unit</b> 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1-4 and 6-17.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-17 is/are pending in the application.
- 4a) Of the above claim(s) 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/19/05</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Examiner's Response*

Applicant's response on March 24, 2008 filed in response to the Election/Restriction dated January 24, 2008 has been received and duly noted. The Examiner acknowledges Applicants' election of

$\text{Ir(ppy)}_3$  as the metal complex of formula  $\text{M}(\text{Ar}^1\text{Ar}^2)_n\text{L}$ ; phenyl pyridine as the bidentate ligand L; and,  $[\text{Ir(ppy)}_3\text{Cl}]_2$  as the compound of Formula I, with traverse.

with traverse. The Applicant requested that the restriction by Examiner Loewe should be removed due to no proof (prior art reference) that breaks unity of invention of the instant application.

Current examiner (Examiner John Mabry) would like to direct Applicant's to Lamansky et al (Inorg. Chem. 2001, 40, 1704-1711) (PTO-1449) as shown in 102(b) rejection below.

Lamansky discloses a method of forming a metal complex of Formula  $\text{M}(\text{Ar}1\text{Ar}2)_n\text{L}$  comprising of reacting a compound of Formula I with bidentate ligand (wherein Ar1 and Ar2 = phenylpyridinyl) compared to that of the instant application. Due to Examiner's Election/Restriction, Applicant's invention was properly restricted.

Thus, the restriction requirement is deemed proper and **FINAL**.

In view of this response, the status of the rejections/objections of record is as follows:

Applicant is respectfully reminded that it is required that all claims be amended to elected group. Examiner also warns Applicant not to introduce new matter when amending.

### ***Specification Objections***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The current title is "Method for the Production of Metal Complexes". Examiner suggests a title that directed towards elected group.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 and 6-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substituent" in respective claims are relative terms which renders the claim indefinite. The term "substituent" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The Oxford Dictionary of Chemistry defines the term "substituent" as an atom or group that

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replaces another in a substitution reaction or an atom or group regarded as having replaced hydrogen atom in a chemical derivative.

The term "substituent" has no clear limitations. Where are the "metes and bounds" of the claims pertaining to the term "substituent"? What does the Applicant intend by this term? Additionally, please indicate where in the Specification is such support.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4 and 6-17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the method of forming compounds (complex) of Formula  $M(Ar_1Ar_2)_nL$  wherein  $M=Ir$  and  $Ar_1$ ,  $Ar_2$  and  $L$  being phenyl and pyridinyl (but not simultaneously), **does not** reasonably provide enablement for the method of forming compounds (complex) of Formula  $M(Ar_1Ar_2)_nL$  where  $M=rhodium$ ,  $platinum$ , or  $palladium$  and  $Ar_1$ ,  $Ar_2$  and  $L$  being all heteroaryl and aryl and all bidentate ligands as claimed.

Additionally, the specification while being enabling for  $n=3$ , does not reasonably provide enablement for  $n$  being 1 and 2 and while being enabling for  $Ar_1$  and  $Ar_2$  being substituted  $Br$  and unsubstituted, does not reasonably provide enablement for  $Ar_1$  and  $Ar_2$  being substituted by all claimed substituents.

Pursuant to *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir.

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1988), one considers the following factors to determine whether undue experimentation is required: (A) The breadth of the claims; (B) The nature of the invention; (C) The state of the prior art; (D) The level of one of ordinary skill; (E) The level of predictability in the art; (F) The amount of direction provided by the inventor; (G) The existence of working examples; and (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure. Some experimentation is not fatal; the issue is whether the amount of experimentation is “undue”; see *In re Vaeck*, 20 USPQ2d 1438, 1444.

The analysis is as follows:

(1) Breadth of claims: Scope of the compounds. Owing to the range of many variables, millions of highly substituted phenylpyridinyl iridium complexes are embraced.

(2) The nature of the invention: The invention is a highly substituted phenylpyridinyl iridium complexes.

(3) Level of predictability in the art: It is well established that “the scope of enablement varies inversely with the degree of unpredictability of the factors involved,” and chemical reactivity (which is affected by determinants such as substituent effects, steric effects, bonding, molecular geometry, etc) is generally considered to be an unpredictable factor. See *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970).

(4) Direction or Guidance: That provided is very limited. Applicant shows a general synthesis of compounds of application's general Formula  $M(Ar_1Ar_2)_nL$ . Pages 13-14 of the Specification describes starting materials and methods for synthesis of compounds wherein wherein  $M=Ir$  and  $Ar_1$ ,  $Ar_2$  and  $L$  being phenyl and pyridinyl,  $n=3$  and  $Ar_1$  and  $Ar_2$  being unsubstituted or substituted by  $Br$ , but does not describe or list any reagents wherein compounds can be used to synthesis compounds where compounds (complex) of Formula  $M(Ar_1Ar_2)_nL$  where  $M=rhodium$ ,  $platinum$ , or  $palladium$  and  $Ar_1$ ,  $Ar_2$  and  $L$  being all heteroaryl and aryl and all bidentate ligands as claimed,  $n$  being 1 and 2 and  $Ar_1$  and  $Ar_2$  being substituted by any substituent. There is limited evidence in the Specification of the example compounds that only covers no or a small portion of the substituents claimed of formula. Thus, there is no specific direction or guidance regarding said compounds specifically mentioned in Scope.

The availability of the starting material that is needed to prepare the invention as claimed is at issue here...As per MPEP 2164.01 (b). A key issue that can arise when determining whether the specification is enabling is whether the starting materials or apparatus necessary to a make the invention are available. In the biotechnical area, this is often true when the product or process requires a particular strain of microorganism and when the microorganism is available only after extensive screening. The Court *in re Ghiron*, 442 F.2d 985, 991, 169 USPQ 723, 727 (CCPA 1971), made it clear that if the practice of a method requires a particular apparatus, the application must provide a sufficient disclosure of the apparatus if the apparatus is not readily

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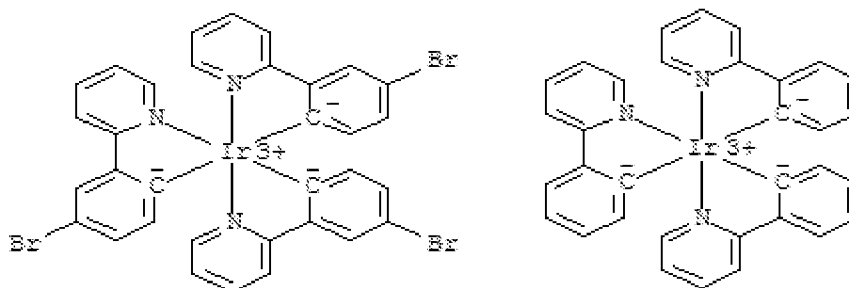
available. The same can be said if certain chemicals are required to make a compound or practice a chemical process. *In re Howarth*, 654 F.2d 103, 105, 210 USPQ 689, 691 (CCPA 1981).

(5) State of the Prior Art: These compounds are substituted phenylpyridinyl iridium complexes wherein Ar1 and Ar2 being phenyl and pyridinyl optionally substituted by alkyl and halogen, which are well documented in the art. So far as the examiner is aware, no substituted phenylpyridinyl iridium complexes of general formula  $M(Ar_1Ar_2)_nL$  wherein Ar1 and Ar2 equals the scope of chemical moieties as claimed by Applicant of any kind have been made or used.

It is not trivial to experimentally interchange any and all of the many substituents that exist. As described by F. Zaragoza Dörwald, most organic syntheses fail initially and chemical research is highly inefficient due to chemists spending most of their time "finding out what went wrong and why". Therefore, most syntheses of organic compounds are labor-intensive and demanding. Additionally, most final synthetic routes to desired organic molecules are usually very different from initially planned routes. A highly skilled chemist can agree that for many successful organic compounds made, many failures are encountered and experimental repetition is common. This also contributes to the burden and unpredictability of the syntheses of said compounds. (see "Side Reactions in Organic Synthesis: A Guide to Successful Synthesis Design" 2005 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.

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(6) Working Examples: Applicant shows examples 1 and 3 (as shown below) but no working examples were shown wherein Ar1, Ar2, n, M and substituents equal as previously mentioned have been made or used of any kind.



(7) Skill of those in the art: The ordinary artisan is highly skilled, e.g. a masters or PhD level chemist.

(8) The quantity of experimentation needed: Since there are very limited working examples as described above, the amount of experimentation is expected to be high and burdensome.

Due to the level of unpredictability in the art, the very limited guidance provide, and the lack of working examples, the Applicant has shown lack of enablement for the groups noted.

MPEP 2164.01(a) states, "A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557,1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)." That conclusion is clearly justified here.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

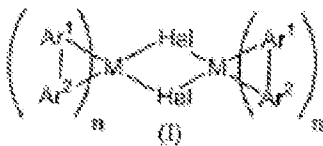
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

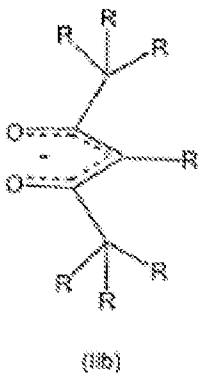
Claims 1-4, 6-8 and 10-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamatani et al (EP 1,349,435 A1) (PTO-1449).

Kamatani discloses a method of forming a metal complex of Formula  $M(Ar_1Ar_2)_nL$  comprising of reacting a compound of Formula I with bidentate ligand (wherein  $Ar_1$  and  $Ar_2$  = phenylpyridinyl):



with an enabling monodentate ligand wherein  $R_1=H$ :

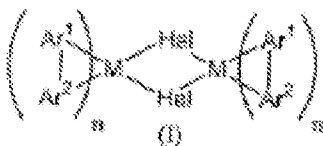
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in a two-step process or in a one-pot process (see pages 42 and 48–50).

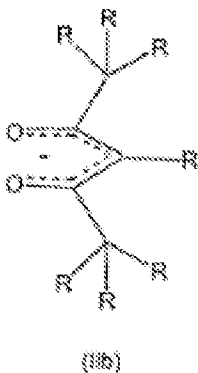
Claims 1-2, 4, 6-8 and 10-16 are rejected under 35 U.S.C. 102 (a) and (e) as being anticipated by Tsuboyama et al (EP 1,239,526 A1) (PTO-1449).

Tsuboyama discloses a method of forming a metal complex of Formula  $M(Ar_1Ar_2)_nL$  comprising of reacting a compound of Formula I with bidentate ligand (wherein  $Ar_1$  and  $Ar_2$  = pyridinyl, naphthyl, thienyl, benzothienyl):



with an enabling monodentate ligand wherein  $R_1=H$ :

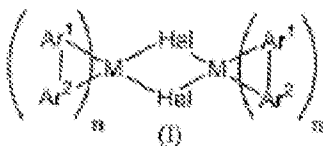
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in a two-step process or in a one-pot process (see pages 5 and 30-33).

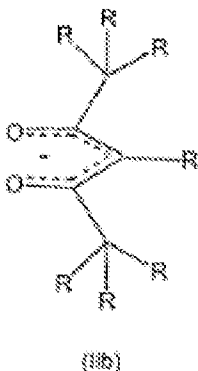
Claims 1-4, 6-8 and 10-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Lamansky et al (Inorg. Chem. 2001, 40, 1704-1711) (PTO-1449).

Lamansky discloses a method of forming a metal complex of Formula  $M(Ar_1Ar_2)_nL$  comprising of reacting a compound of Formula I with bidentate ligand (wherein  $Ar_1$  and  $Ar_2$  = phenylpyridinyl):



with an enabling monodentate ligand wherein  $R_1=H$ :

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in a two-step process or in a one-pot process (see Experimental Section on pages 1705-1707).

Claims 1-4 and 6-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Lamansky et al (WO 02/15645 A1) (PTO-1449).

Lamansky discloses a method of forming a metal complex of Formula  $M(Ar_1Ar_2)_nL$  comprising of reacting a compound of Formula I with bidentate ligand, wherein  $Ar_1$  and  $Ar_2$  = phenylpyridinyl and monodentate ligands, wherein  $Ar_1$  and  $Ar_2$ =pyridine and triphenylphosphine comprising of the step of reacting compound of formula I with bidentate and monodentate ligands (see bottom of page 22-top of page 26 and see claims 3, 7, 8, 9, 29 and figures 1a, 5d, 7m, 7p, 8b and 8c). There are many more examples of variations and derivatives of  $Ar_1$ ,  $Ar_2$ , monodentate and bidentate ligands as claimed (see entire disclosure).

***Conclusion***

Applicant is respectfully reminded that it is required that all claims be amended to elected group. Examiner also warns Applicant not to introduce new matter when amending.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Mabry, PhD whose telephone number is (571) 270-1967. The examiner can normally be reached on M-F from 9am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres, PhD, can be reached on (571) 272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/John Mabry, PhD/  
Examiner  
Art Unit 1625

/Rita J. Desai/  
Primary Examiner, Art Unit 1625